FLEXIBLE DISPLAY SUPPORTED BY HINGED FRAME

FIELD OF THE INVENTION

The present invention generally relates to flexible displays. The present invention specifically relates to an efficient incorporation of a flexible display into a wrap display system.

BACKGROUND

Rolling display systems currently employ flexible displays that are rolled into a case for facilitating a storage of the flexible display therein, and unrolled out of the case for facilitating an operation of the flexible display. An example of such a rolling display system is disclosed in U.S. Patent Application Publication No. 2002/0196205A1. Within the case, the flexible display can be wrapped around various display driving components within the case whereby either a rolling radius of the flexible display must be large enough to support immobile display drive components within the case and/or movement among display drive components within the case is required to facilitate the rolling/unrolling of the flexible display. One drawback to this rolling/unrolling approach of the flexible display are the limitations imposed on a construction of an optimal shape of the case with minimal dimensions for purposes of achieving a highest degree of portability of the case at minimal cost.

One solution to this drawback is a wrap display system having a flexible display that is wrapped around a stick for facilitating a storage of the flexible display and unwrapped from the stick for facilitating an operation of the flexible display. The unwrapping of the flexible display from the stick requires the flexible display being flat and straight to facilitate an adequate readability of the flexible display. The display industry is therefore continually striving to improve upon an incorporation of a flexible display into a display system in view of achieving an adequate readability of the flexible display.

SUMMARY OF THE INVENTION

To this end, the present invention provides new and unique structural forms of a wrap display system having a flexible display that is wrapped around a stick for facilitating a storage of the flexible display and unwrapped from the stick for facilitating an operation of the flexible display. The wrap display system further includes a hinged frame structurally configured to support the flexible display. In a first form of the present invention, the hinged frame has a curvilinear configuration for fixing the flexible display in a storage position with respect to the stick in response to the flexible display being wrapped around the stick. In a second form of the present invention, the hinged frame has a planar configuration for fixing the flexible display in an operational position with respect to the stick in response to the flexible display being unwrapped from the stick.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing forms as well as other features and advantages of the present invention will become further apparent from the following detailed description of various embodiments of the present invention, read in conjunction with the accompanying drawings. The detailed description and drawings are merely illustrative of the present invention rather than limiting, the scope of the present invention being defined by the appended claims and equivalents thereof.

FIG. **1** illustrates a top view of one embodiment of a flexible display foil in accordance with the present invention;

FIG. **2** illustrates a top view of one embodiment of a hinged rigid base supporting a flexible display foil in accordance with the present invention;

FIGS. **3** and **4** illustrate side views of a curvilinear configuration and a planar configuration of a flexible display foil in accordance with the present invention;

FIGS. **5** and **6** illustrate side views of a first embodiment of a hinged rigid base supporting the flexible display illustrated in FIGS. **3** and **4** in the curvilinear position and the planar position, respectively, in accordance with the present invention;

FIGS. **7** and **8** illustrate side views of a second embodiment of a hinged rigid base supporting the flexible display illustrated in FIGS. **3** and **4** in the curvilinear position and the planar position, respectively, in accordance with the present invention;

FIG. **9** illustrates a front view of a first embodiment of a stick in accordance with the present invention;

FIG. **10** illustrates a front view of a second embodiment of a stick in accordance with the present invention;

FIGS. **11** and **12** illustrate perspective views of a first embodiment of a wrap display system in a storage state and an operational state, respectively, in accordance with the present invention;

FIGS. **13** and **14** illustrate respective side views of the wrap display system illustrated in FIGS. **11** and **12** in accordance with the present invention;

FIG. **15** illustrates a perspective view of a second embodiment of a wrap display system in an operational state in accordance with the present invention; and

FIGS. **16** and **17** illustrate side views of the wrap display system illustrated in FIG. **15** in a storage state and an operation state, respectively, in accordance with the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

One inventive principle of the present invention is to structurally configure a flexible display foil including an integration of a flexible display and a display cover that can be wrapped and unwrapped from around a stick. The present invention does not impose any limitations or restrictions as to the integration of the flexible display and the display cover. Thus, the term "integration" is broadly defined herein as an assembly of the flexible display and the display cover as a single unit, such as, for example, a mounting of the flexible display onto an external surface of the display cover, or a positioning of the flexible display within a multi-layered display cover where the flexible display is viewable through an open window or a transparent window of the display cover.

The present invention also does not impose any limitations or restrictions on the structural configuration and material composition of a flexible display and a display cover of the present invention. In one embodiment, a flexible display of the present invention can be a device provided by a company presently being organized called Polymer Vision Ltd., which has a layered flexible display consisting of a back layer of a thin/organic film serving as a base, a middle layer of organic electronics serving as an active matrix for driving the images of the flexible display, and a top layer of an electronic ink printed on a sheet of plastic.

In practice, the specific implementations of a flexible display foil of the present invention is dependent upon the com-